# CITY OF REXBURG (PWS 7330022)
# SOURCE WATER ASSESSMENT REPORT

**May 27, 2005**

**State of Idaho**
**Department of Environmental Quality**

## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for City of Rexburg, Idaho Falls, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The City of Rexburg (PWS #7330022) has an additional drinking water system well that needs a susceptibility analysis conducted. This report describes only the Smith Park Well. Previously, “City of Rexburg (PWS #7330022) Source Water Assessment Final Report” was written to assess the other active wells on this system, and is available from DEQ upon request. Currently, the system serves approximately 17,252 people through 1,811 connections.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other category(ies) results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of total susceptibility, the Smith Park Well rated moderate susceptibility for IOCs, VOCs, SOCs, and microbial bacteria. System construction and hydrologic sensitivity rated moderate susceptibility for the well. Land use rated high susceptibility for IOCs, VOCs, SOCs, and low susceptibility for microbial bacteria (Table 1). The largest influences upon overall scores were the number of sources (Figure 2 and Table 2) and amount of agricultural land within the delineation.

No microbial bacteria have ever been detected in the well’s tested water. Traces of the IOC nitrate have been detected in the well. Despite existing in a county with high nitrogen fertilizer use, high herbicide use, and high agricultural chemical use, nitrate has only been detected in concentrations less than 1.29 parts per million (ppm). The maximum contaminant level (MCL) for nitrate is 10 ppm. No SOCs and VOCs have been detected in this system’s tested water.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Rexburg, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Actions should be taken to maintain a 50-foot radius circle around the wellhead clear of potential contaminants. Any contaminant spills within the delineation should be carefully monitored and dealt with. As much of the designated assessment areas are outside the direct jurisdiction of City of Rexburg, collaboration and partnerships with state and local agencies should be established and are critical to success.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation contains some urban and residential land uses. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the Department of Environmental Quality or the Idaho Rural Water Association.

# SOURCE WATER ASSESSMENT FOR
# CITY OF REXBURG, IDAHO

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

### Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

### Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. EPA to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments for sources active prior to 1999 were completed by May of 2003. Source water assessments for sources activated post-1999 are being developed on a case-by-case basis. The resources and time available to accomplish assessments are limited. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

## Section 2. Conducting the Assessment

### General Description of the Source Water Quality

The City of Rexburg (PWS #7330022) has an additional drinking water system well that needs a susceptibility analysis conducted. This report describes only the Smith Park Well. Previously, "City of Rexburg (PWS #7330022) Source Water Assessment Final Report" was written to assess the other active wells on this system, and is available from DEQ upon request. Currently, the system serves approximately 17,252 people through 1,811 connections.

No microbial bacteria have ever been detected in the well's tested water. Traces of the IOC nitrate have been detected in the well. Despite existing in a county with high nitrogen fertilizer use, high herbicide use, and high agricultural chemical use, nitrate has only been detected in concentrations less than 1.29 parts per million (ppm). The maximum contaminant level (MCL) for nitrate is 10 ppm. No SOCs and VOCs have been detected in this system's tested water.

### Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ performed the delineation using a computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Snake River Plain aquifer in the vicinity of the City of Rexburg. The computer model used site-specific data from a variety of sources including local area well logs, and hydrogeologic reports (detailed below).

### Hydrogeologic Conceptual Model

The capture zones for the source well were modeled using the WhAEM Model 2000, version 1.0.4. The model was run by inputting hydrogeologic data estimated from well logs, topographic maps, geologic maps, and previous studies conducted in the area. Boundary conditions and initial aquifer property estimates were inputted into the model and then ran over a series of simulations. Parameters were adjusted in these simulations until a "best fit" approximation was achieved.

Boundary conditions inputted into the model were based on previous modeling efforts conducted in this area. The regional aquifer flowing through this area has been modeled previously, and parameters used in the previous model were incorporated into this model. The boundaries incorporated from the previous model include the constant head boundaries. Other boundaries used in the previous model to represent loosing/gaining stream segments were not included into this model.

To simulate the general ground water flow direction of the regional system, constant head boundaries were placed on the northern and southern portions of the study area. The head values assigned to these boundaries were 4900 feet above mean sea level (amsl) along the northern extent and 4490 amsl to the south, generating a southwestern flow direction.

Another boundary incorporated from the previous model was a constant flux boundary along the eastern portion of the model. This boundary was designed to simulate recharge occurring from underflow of adjacent aquifer systems. The flux value assigned to this boundary was –2.9 $ft^2$/day A boundary condition not incorporated into this model was the constant flux/head boundary placed on the Snake River. Due to the depths of the wells and the water levels within the wells, the Snake River does not appear to be in direct hydraulic connection with the ground water. Therefore, the Snake River was not included in the model as a boundary condition. The presence of this boundary was investigated through the modeling process, but due to unrealistic capture zone delineations, the boundary was not incorporated into the "best fit" scenario of the model.

Two no-flow boundaries incorporated into this model were placed to simulate the geologic boundaries in the area. Silica rich volcanic units that border the ESRP basalt flows to the east were simulated as constant flux recharge boundaries in previous models. To eliminate near-field interference associated with these flux boundaries and represent realistic capture zones, the geologic contacts were modeled as no flow boundaries.

Finally, a no-flow boundary was arbitrarily placed around the study area to define the extent of the model. The presence of this boundary limits the area required to be calculated by the model.

Once the boundary conditions and aquifer parameters were inputted into the model, the model was run over a series of simulations until a "best fit" scenario was achieved. The "best fit" scenario was defined by the closeness of test point matches. The test points are wells in the area completed in the same aquifer. Water levels taken from the well logs of these test points are compared to the head values predicted by the model. Model parameters are adjusted until the calculated values best match the measured values, resulting in the "best fit" scenario. The parameters entered into the model for the "best fit" scenario are:

| | |
|---|---|
| Aquifer base elevation (ft amsl): | 4200 |
| Aquifer thickness (ft): | 200 |
| Hydraulic conductivity (ft/day): | 300 |
| Recharge (ft/day): | 0.0046 |
| Porosity: | 0.15 |

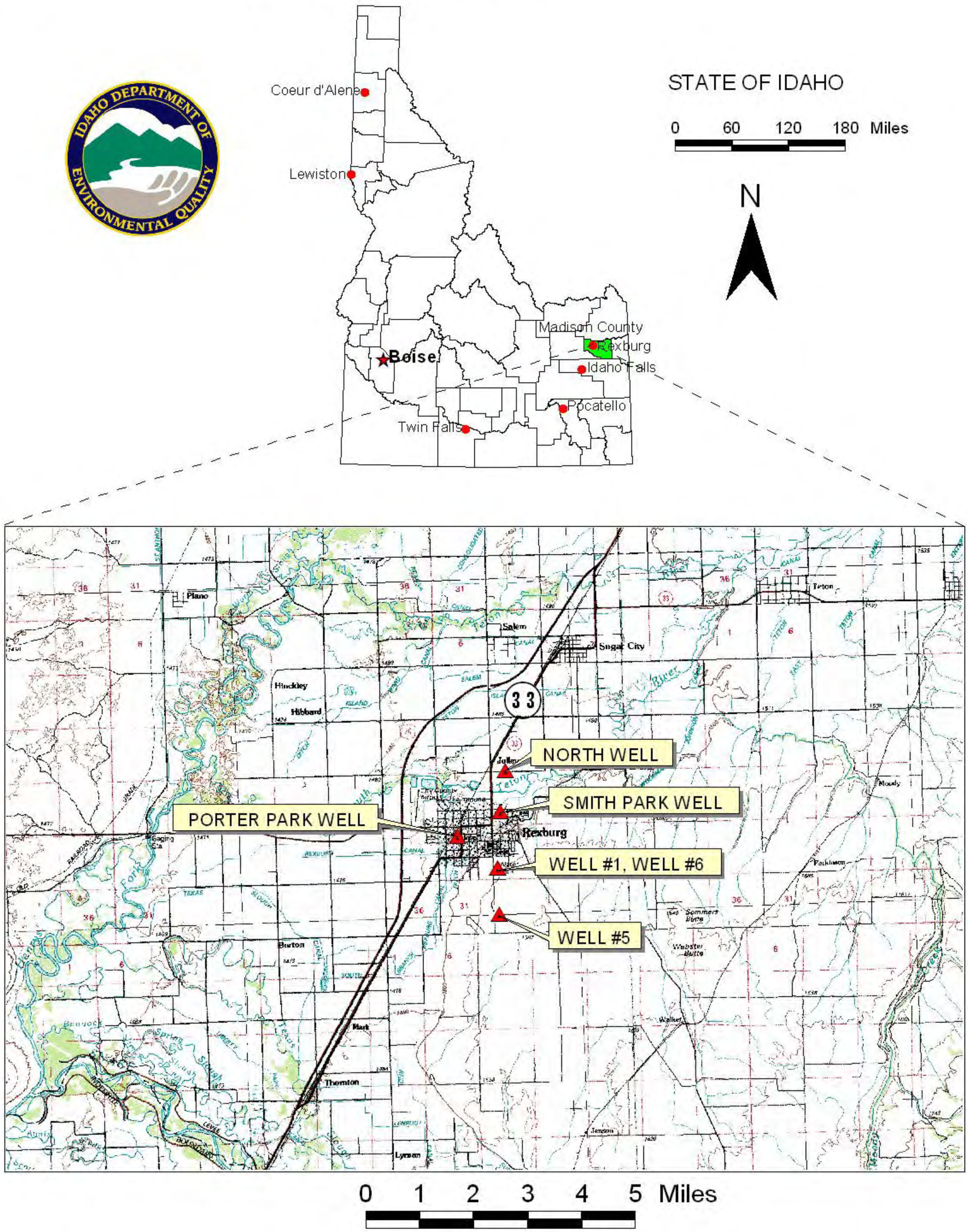
The aquifer base elevation, thickness, recharge, and porosity were all estimated from the previous model ran in this area (WGI, 2001). The hydraulic conductivity was adjusted until the best test point match was achieved. The hydraulic conductivity for the basalt aquifer ranges from 25 to 1700 ft/day (WGI, 2001). Extreme ranges of hydraulic conductivity (50 to 1700 ft/day) were entered into the model to determine the best approximation for these particular wells. Based on the test point matches, the hydraulic conductivity value that created the best test point match was 300 ft/day.

The range in error associated with the test point match can be attributed to the estimating procedure involved in locating and assigned head values to the test points. The head values for the test points were taken from the well logs and approximated using a topographic map. The topographic map was used to estimate locations and elevations of the wells, resulting in potential measurement error. Therefore, test point matches within +/- 50 feet are considered adequate.

The pumping rates entered into the model for the source well was 350 gallons per minute (gpm). The reported pumping rate for the well was unknown and estimated from other city wells. The increase in modeled pumping rates is done as a factor of safety. This increased pumping rate incorporates any potential measurement errors in the reported rate as well as considers the potential of the system to increase production in the future.

The delineated area for the City of Rexburg Smith Park Well is a southeast trending sector approximately 6 miles long which widens to approximately 3 miles at it's most distant point from the well. The actual data used in determining the source water assessment delineation area is available from DEQ upon request.

***FIGURE 1 Site Vicinity Map of City of Rexburg***



## Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the area surrounding this City of Rexburg well is predominately irrigated agriculture.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the <u>potential</u> for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

## Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in April and May 2004. The first phase involved identifying and documenting potential contaminant sources within the City of Rexburg source water assessment area (Figure 2) through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas.

The delineated source water area for the well (Figure 2) has 21 potential contaminant sources (Appendix B).

## Section 3. Susceptibility Analyses

The well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheet. The following summaries describe the rationale for the susceptibility ranking.

### Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

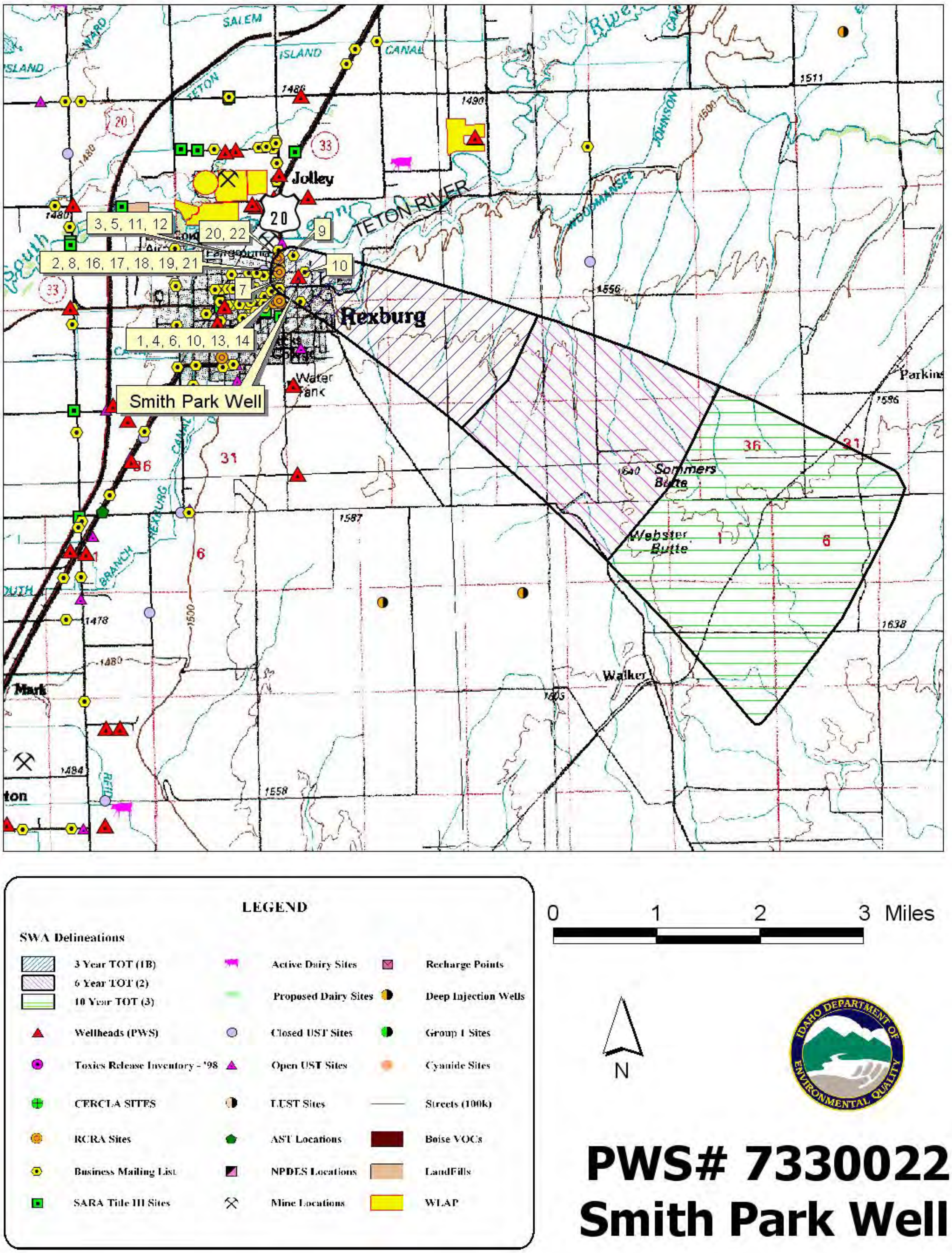
The Smith Park Well rated moderate for hydrologic sensitivity. The Natural Resource Conservation Service characterized area soils as moderately- to well-drained, a setting which allows for surface-related potential contaminants to have a higher vertical mobility and be less protective of ground water. In addition, the vadose zone is composed of predominantly permeable units, the depth to first water is less than 300 feet below ground surface (bgs), and no aquitard is present above the producing zone of the well.

### Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The Smith Park Well was drilled in 1973 to a depth of 94 feet bgs. A bentonite seal was placed from the surface to 40 feet below ground surface (bgs) into "cinders". An unscreened 8-inch steel casing (0.25 inches thick) was placed from the ground surface and seated into basalt at 40 feet bgs. No discharge tests were indicated on the well log. At the time of completion, the static water level was 33 feet below ground surface.

***Figure 2. City of Rexburg Delineation Map and Potential Contaminant Source Locations***



The Smith Park Well rated moderate susceptibility for system construction. The well is located outside of a 100-year floodplain and its annular seal extends into a low permeability unit. The moderate rating is a result of the steel casings not being seated into a low-permeability unit, the highest production coming from less than 100 feet below the water table, and the well not meeting all current construction standards.

Current PWS well construction standards can be more stringent than when a well(s) was constructed. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the regulations deal with screening requirements, aquifer pump tests, use of a down-turned casing vent, and thickness of casing. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Eight-inch diameter wells require a casing thickness of 0.322-inches. Because the well's construction does not meet all current standards, the well was assessed an additional system construction point.

**Potential Contaminant Sources and Land Use**

Land use for the Smith Park Well rated high susceptibility for IOCs, VOCs, SOCs, and low for microbials. The high percentage of irrigated agricultural land within the delineation, and it's location within a county of high fertilizer use, high herbicide use, and high agricultural chemical use contributed the highest amount to the ratings. Also factoring into the scoring were the multiple sources in the 0-3 Year TOT.

**Final Susceptibility Ranking**

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well, despite the land use of the area, because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking. In this case, the well did not receive any automatic high ratings.

**Table 1. Summary of City of Rexburg Susceptibility Evaluation**

| | Susceptibility Scores[1] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Hydrologic Sensitivity | Contaminant Inventory | | | | System Construction | **Final Susceptibility Ranking** | | | |
| Well | | IOC | VOC | SOC | Microbials | | IOC | VOC | SOC | Microbials |
| Smith Park Well | M | H | H | H | L | M | M | M | M | M |

[1]**H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,**
**IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

**Susceptibility Summary**

This report describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

In terms of total susceptibility, the Smith Park Well rated moderate susceptibility for IOCs, VOCs, SOCs, and microbial bacteria. System construction and hydrologic sensitivity rated moderate susceptibility for the well. Land use rated high susceptibility for IOCs, VOCs, SOCs, and low susceptibility for microbial bacteria (Table 1). The largest influences upon overall scores were the number of sources (Figure 2 and Table 2) and amount of agricultural land within the delineation.

No microbial bacteria have ever been detected in the well's tested water. Traces of the IOC nitrate have been detected in the well. Despite existing in a county with high nitrogen fertilizer use, high herbicide use, and high agricultural chemical use, nitrate has only been detected in concentrations less than 1.29 ppm. The MCL for nitrate is 10 ppm. No SOCs and VOCs have been detected in this system's tested water.

## Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For City of Rexburg, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. Actions should be taken to keep a 50-foot radius circle clear around the wellheads. Any spills within the delineation should be carefully monitored and dealt with. As much of the designated protection area is outside the direct jurisdiction of City of Rexburg, making collaboration and partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. The well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A public education program should be a primary focus of any drinking water protection plan as the delineation is near residential land uses areas. Public education topics could include proper household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the DEQ or the Idaho Rural Water Association.

**Assistance**

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

| | |
|---|---|
| Idaho Falls Regional DEQ Office | (208) 528-2650 |
| State DEQ Office | (208) 373-0502 |

Website: http://www.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at 1-208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

# POTENTIAL CONTAMINANT INVENTORY
# LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks) –** Sites with aboveground storage tanks.

**Business Mailing List –** This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS –** This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site –** DEQ permitted and known historical sites/facilities using cyanide.

**Dairy –** Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well –** Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain –** This is a coverage of the 100year floodplains.

**Group 1 Sites –** These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area –** Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill –** Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area –** Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System) –** Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas –** These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point –** This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS –** Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) –** These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank) –** Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads –** These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

## References Cited


Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Division of Environmental Quality, 1999, Idaho Source Water Assessment Plan, October, 39 p.

Idaho Division of Environmental Quality, 1997, Idaho Wellhead Protection Plan, Idaho Wellhead Protection Work Group, February.

Idaho Department of Water Resources. Well Log for tag number 044703

Washington Group International (WGI), 2001. Source Area Delineation Report Upper Eastern Snake River Plain Hydrologic Province July 2001.

# Appendix A

# City of Rexburg
# Susceptibility Analysis
# Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

**Public Water System Name:** City of Rexburg
**Public Water System Number:** 7330022
**Well Number:** Smith Park
**Date:** 5/25/2005
**Person Conducting Assessment:** Dennis Owsley

## *Hydrologic Sensitivity Worksheet*

| | | | | Value |
|---|---|---|---|---|
| (1) | Do the soils belong to drainage classes in the poorly drained through moderately well drained categories? | ○ Yes | ◉ No | 2 |
| (2) | Is the vadose zone composed predominantly of gravel, fractured rock; or is unknown? | ◉ Yes | ○ No | 1 |
| (3) | Is the depth to first groundwater greater than 300 feet? | ○ Yes | ◉ No | 1 |
| (4) | Is an aquitard present with silt/clay or sedimentary interbeds within basalt with greater than 50 feet cumulative thickness? | ◉ Yes | ○ No | 0 |
| | | | **Hydrologic Sensitivity Score =** | **4** |

Final Hydrologic Sensitivity Ranking = Moderate Hydrologic Sensitivity Score (2 to 4 points)

| | | | | |
|---|---|---|---|---|
| Public Water System Name: | City of Rexburg | Version 2.1 | | |
| Public Water System Number: | 7330022 | 5/19/1999 | | |
| Well Number: | Smith Park | | | |
| Date: | 38497 | | | |
| Person Conducting Assessment: | Dennis Owsley | | | |

## *Potential Contaminant Source/Land Use Worksheet*

### Land Use/Zone IA

| | | | | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|---|---|---|
| (1) | Land Use (Pick the Predominant Land Type) | Irrigated Cropland | | 2 | 2 | 2 | 2 |
| (2) | Is Farm Chemical Use High or Unknown? (Answer No if (1) = Urban/Commercial) | ○ Yes | ◉ No | Stop: Go Directly to Step 3 | | | |
| 2a | Indicate appropriate chemical category | ☑ IOCs ☑ VOCs ☑ SOCs | | 0 | 0 | 0 | 0 |
| (3) | Are IOC, VOC, SOC, Microbial or Radionuclide contaminant sources Present in Zone IA? OR Have SOC/VOC contaminants been detected in the well? OR have IOC contaminants been detected above MCL levels in the well? If Yes, please check the appropriate chemical | ○ Yes ☐ IOCs ☐ VOCs ☐ SOCs ☐ Microbials | ◉ No | | | | |
| | | | Land Use Subtotal | 2 | 2 | 2 | 2 |

### Zone IB

| | | | | | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|---|---|---|---|
| (4) | Contaminant Sources Present in Zone IB? | ◉ Yes | ○ No | | | | | |
| | Number of Sources in Zone IB in Each Category? | | # IOC Sources | 4 | 8 | 8 | 8 | 4 |
| | (List sources by Category up to a Maximum of Four per Category) | | # VOC Sources | 4 | | | | |
| | | | # SOC Sources | 4 | | | | |
| | | | # Microbial Sources | 2 | | | | |
| (5) | Are there Sources of Class II or III Leachable Contaminants in Zone IB? | ◉ Yes | ○ No | | | | | |
| | (List Sources up to a Maximum of Four per Category) | | # IOC Sources | 4 | 4 | 4 | 4 | 0 |
| | | | # VOC Sources | 4 | | | | |
| | | | # SOC Sources | 4 | | | | |
| (6) | Does a Group 1 Priority Area Intercept or Group 1 Priority Site Fall Within Zone IB? | ○ Yes ☐ IOCs ☐ VOCs ☐ SOCs ☐ Microbials | ◉ No | | 0 | 0 | 0 | 0 |
| (7) | Pick the Best Description of the Amount and Type of Agricultural Land in Zone IB. | Greater Than 50 % Irrigated Agricultural Land | | | 4 | 4 | 4 | 4 |
| | | | Zone IB Subtotal | | 16 | 16 | 16 | 8 |

| Zone II | | | | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|---|---|---|
| (9) | Are Contaminant Sources Present in Zone II? | ☉ Yes ○ No | Complete Step 9a | | | | |
| 9a | What types of chemicals? | ☑ IOCs ☑ VOCs ☑ SOCs | | 0 | 0 | 0 | 0 |
| (10) | Are there Sources of Class II or III Leachable Contaminants in Zone II? | ☉ Yes ○ No | Complete Step 10a | | | | |
| 10a | What type of contaminant? | ☑ IOCs ☑ VOCs ☑ SOCs | | 0 | 0 | 0 | 0 |
| (11) | Pick the Best Description of the Amount and Type of Agricultural Land in Zone II. | Greater Than 50 % Irrigated Agricultural Land | | 2 | 2 | 2 | 0 |
| | | Zone II Subtotal | | 2 | 2 | 2 | 0 |

| Zone III | | | | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|---|---|---|
| (12) | Contaminant Sources Present in Zone III? | ☉ Yes ○ No | Complete Step 12a | | | | |
| 12a | What types of contaminant? | ☑ IOCs ☑ VOCs ☑ SOCs | | 0 | 0 | 0 | 0 |
| (13) | Are there Sources of Class II or III Leachable Contaminants in Zone III? | ☉ Yes ○ No | Complete Step 13a | | | | |
| 13a | What types of contaminants? | ☑ IOCs ☑ VOCs ☑ SOCs | | 0 | 0 | 0 | 0 |
| (14) | Is there Irrigated Agricultural Land That Occupies > 50% of Zone III? | ☉ Yes ○ No | | 1 | 1 | 1 | 0 |
| | | Zone III Subtotal | | 1 | 1 | 1 | 0 |

| | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|
| **Community and Non-Community, Non-Transient System Contaminant Source/Land Use Score** | 21 | 21 | 21 | 10 |

| | |
|---|---|
| **Final Community/NC-NT System Ranking** | IOC Score = High Contaminant/Land Use Score (21 to 30 points) |
| | VOC Score = High Contaminant/Land Use Score (21 to 30 points) |
| | SOC Score = High Contaminant/Land Use Score (21 to 30 points) |
| | Microbial Score = Low Contaminant/Land Use Score ( 0 to 10 points) |

| | | |
|---|---|---|
| **Public Water System Name:** | City of Rexburg | |
| **Public Water System Number:** | 7330022 | |
| **Well Number:** | Smith Park | |
| **Date:** | 5/25/2005 | |
| **Person Conducting Assessment:** | Dennis Owsley | |

## *Source Construction Worksheet*

| | | | | Year | Value |
|---|---|---|---|---|---|
| (1) | Well Drill Date | Input Date | December 31, 1973 | | |
| (2) | Well Drillers Log Available? | ◉ Yes ◯ No | | | |
| (3) | Sanitary Survey Available? If Yes, for what year? | ◉ Yes ◯ No | | na | |
| (4) | Are current IDWR well construction standards being met? | | ◯ Yes ◉ No | | 1 |
| (5) | Is the wellhead and surface seal maintained in good condition? | | ◉ Yes ◯ No | | 0 |
| (6) | Do the casing and annular seal extend to a low permeability unit? | | ◉ Yes ◯ No | | 0 |
| (7) | Is the highest production interval of the well at least 100 feet below the static water level? | | ◯ Yes ◉ No | | 1 |
| (8) | Is the well located outside the 100 year floodplain and is it protected from surface runoff? | | ◉ Yes ◯ No | | 0 |
| | | **Source Construction Score =** | | | **2** |
| | Final Source Construction Ranking = | Moderate Source Construction Score (2 to 4 points) | | | |

| | |
|---|---|
| **Public Water System Name:** | City of Rexburg |
| **Public Water System Number:** | 7330022 |
| **Well Number:** | Smith Park |
| **Date:** | 5/25/2005 |
| **Person Conducting Assessment:** | Dennis Owsley |

## *SWA Susceptibility Rating Sheet*

### Zone IA Susceptibility Rating

**Warning**: Due to specific conditions found in Zone IA this well has been assigned a High overall susceptibility for: No Contaminant Categories

*This rating is based on: (1)The presence of contaminant sources in Zone IA or (2)The detection of specific SOC/VOC chemicals in the well or (3)The detection of specific IOC chemicals above MCL levels in the well. Public Water Systems may petition IDEQ to revise susceptibility rating based on elimination of contaminant sources or other site-specific factors.*

| Community and Noncommunity-Nontransient Sources | IOC Score | SOC Score | VOC Score |
|---|---|---|---|
| *Hydrologic Sensitivity Score =* | 4 | 4 | 4 |
| *Potential Contaminant Source/Land Use Score X 0.20 =* | 4 | 4 | 4 |
| *Source Construction Score =* | 2 | 2 | 2 |
| **Total** | **10** | **10** | **10** |

**FINAL WELL RANKING**

**IOC Ranking is Moderate (6 to 12 points)**

**SOC Ranking is Moderate (6 to 12 points)**

**VOC Ranking is Moderate (6 to 12 points)**

| Microbial Susceptibility Rating | Score |
|---|---|
| *Hydrologic Sensitivity Score =* | 4 |
| *Potential Contaminant Source/Land Use Score X 0.375 =* | 4 |
| *Source Construction Score =* | 2 |
| **Total** | **10** |

**FINAL WELL RANKING**

**Microbial Ranking is Moderate (6 to 12 points)**

# Appendix B

# Table 2
# Potential Contaminant Inventory

Table 2. City of Rexburg, Smith Park Well, Potential Contaminant Inventory

| SITE | Source Description[1] | TOT[2] ZONE | Source of Information | Potential Contaminants[3] |
|---|---|---|---|---|
| 1 | UST Site; gas station | 0-3 YR | Database Search | VOC, SOC |
| 2, 16 | UST Site; gas station, car wash | 0-3 YR | Database Search | VOC, SOC |
| 3, 12 | UST Site; hospital | 0-3 YR | Database Search | VOC, SOC |
| 4 | UST Site; furniture store | 0-3 YR | Database Search | VOC, SOC |
| 5 | Farm Supplies | 0-3 YR | Database Search | IOC, VOC, SOC, Microbial |
| 6 | Tire Dealer | 0-3 YR | Database Search | IOC, VOC, SOC |
| 7 | Electrical Equipment Manufacture | 0-3 YR | Database Search | IOC, VOC, SOC |
| 8 | Tractor Dealer | 0-3 YR | Database Search | IOC, SOC, VOC |
| 9 | Photo Finishing | 0-3 YR | Database Search | IOC, VOC |
| 10 | Auto Parts | 0-3 YR | Database Search | IOC, VOC, SOC |
| 11 | Potato Harvest | 0-3 YR | Database Search | IOC, SOC, Microbial |
| 13 | Auto Parts | 0-3 YR | Database Search | IOC, VOC, SOC |
| 14 | Auto Parts | 0-3 YR | Database Search | IOC, VOC, SOC |
| 15 | X-Ray Laboratory | 0-3 YR | Database Search | IOC, VOC, SOC |
| 17 | Metal Building Construction | 0-3 YR | Database Search | IOC, VOC, SOC |
| 18 | Plumbing Wholesaler | 0-3 YR | Database Search | IOC, VOC, SOC |
| 19 | Boat Dealer | 0-3 YR | Database Search | IOC, VOC, SOC |
| 20 | Farm Equipment | 0-3 YR | Database Search | IOC, VOC, SOC |
| 21 | RCRA Site | 0-3 YR | Database Search | IOC, VOC, SOC |
| 22 | RCRA Site | 0-3 YR | Database Search | IOC, VOC, SOC |
| | Union Pacific Railroad | 6-10 YR | GIS Map | IOC, VOC, SOC |

**[2] SARA Site = Superfund Authorization Recovery Act, NPDES Site = National Pollutant Discharge Site, UST Site = Underground Storage Tank, LUST Site = Leaking Underground Storage Tank, RCRA Site = Resource Conservation Recovery Act Site, WLAP Site = Waste Land Application Site.**
**[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead**
**[3] IOC = inorganic chemical, SOC = synthetic organic chemical, VOC = volatile organic chemical**